

REMARKS

Claims 1 to 7 were pending in the present application. Applicant has amended claims 1, 2, 6, and 7. Claims 1 to 7 remain pending.

Notice of References Cited

The Examiner cited U.S. Patent No. 6,823,376 ("George et al.") in the § 103(a) rejection of claim 6. However, the Examiner did not include George et al. in the Notice of References Cited. Appropriate correction is requested.

Specification

The Examiner requested the Applicant to amend paragraphs 12, 17, and 21 with the pre-grant publication and patent numbers of the referenced patent applications. However, the referenced patent applications have not been published or issued. Accordingly, Applicant has not amended paragraphs 12, 17, and 21.

§ 103(a) Rejections of Claims 1 to 7

Claim 1

The Examiner rejected claim 1 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent App. Pub. No. 2003/0084242 ("Strange et al.") in view of U.S. Patent App. Pub. No. 2001/0010070 ("Crockett et al.").

Applicant has amended claim 1, which now recites:

1. A method for resynchronizing a primary volume in a primary system and a secondary volume in a secondary system over a network, comprising:

when a network connection between the primary system and the secondary system is interrupted:

creating a snapshot of the primary volume, the snapshot identifying only original data from the primary volume that are overwritten after the snapshot is created;

determining data updates transmitted from the primary system to the secondary system that were not acknowledged by the secondary system;

when the network connection is reestablished:

based on the snapshot, determining new data written to the primary volume between when the network connection is interrupted and reestablished; and

transmitting the new data and the unacknowledged data updates from the primary system to the secondary system.

Amended claim 1 (emphasis added).

Strange et al.

Applicant submits that Strange et al. does not disclose, when a connection between a primary volume and a secondary volume is interrupted, creating a snapshot of a primary volume that only identifies original data from the primary volume that are overwritten after the snapshot is created (e.g., a “copy-on-write” snapshot) as recited in amended claim 1. Instead, Strange et al. discloses, when one of two plaxes is down, creating a resync snapshot that identifies all the original data in a root inode. “A snapshot 300, being a copy of a root inode 100, identifies all blocks identified by the root inode 100 at the time snapshot 300 was created.” Strange et al., paragraph [0035].

Furthermore, Applicant submits that Strange et al. does not disclose, based on the snapshot, determining new data written to the primary volume between when the network connection is interrupted and when the network connection is reestablished (i.e., between when the snapshot is created and when network connection is reestablished) as recited in amended claim 1. Instead, Strange et al. discloses, based on the differences between a base snapshot and a resync snapshot, determining new data written to the operating plex between the creation of the base snapshot and the creation of the resync snapshot. “In action 714, the difference between the base snapshot and the resync snapshot is determined. Continuing in action 716 of FIG. 7, the difference between the base and resync snapshots is copied to the formerly down plex.” Strange et al., paragraphs [0063] and [0069].

These above distinctions help the invention of amended claim 1 to perform better than the invention of Strange et al. as follows. The invention of amended claim 1 requires only one snapshot. In contrast, Strange et al. requires two snapshots. The invention of amended claim 1 will only update the secondary volume with changes to the primary volume that occur between when the network connection is interrupted and reestablished. In contrast, Strange et al. will update the formerly down plex with changes to the operating plex that occur between when the base and the resync snapshots

are created. If the base snapshot was created much earlier than when the formerly down plex went offline, the formerly down plex would be updated with numerous repetitive data that are already in the formerly down plex.

Crockett et al.

Applicant submits that Crockett et al. does not disclose, when a network connection between a primary system and a secondary system is interrupted, determining data updates transmitted from the primary system to the secondary system that were not acknowledged by the secondary system. Crockett et al. only discloses, when a backup storage is offline, recording tracks of data writes to a primary storage that were not mirrored to the backup storage in an update map. “In these situations, the data mover stores any data records received by the storage system in the primary storage without mirroring the data records to the backup storage. The data mover also identifies the tracks that these data records are on in an update map.” Crockett et al., paragraph [0012].

For the above reasons, amended claim 1 is patentable over Strange et al. in view of Crockett et al.

Claims 2 to 5

Claims 2 to 5 depend from amended claim 1 and are patentable over the cited references for at least the same reasons as amended claim 1.

Claim 6

The Examiner rejected claim 6 as being unpatentable over Strange et al. in view of Crockett et al. and further in view of George et al. Claim 6 depends from amended claim 1 and is patentable over the cited references for at least the same reasons as amended claim 1. Furthermore, claim 6 recites “searching for exceptions in exception tables in the snapshot, wherein the exception tables only identify the original data that were (1) in the primary volume at a time the snapshot was created and (2) later overwritten after the snapshot was created,” which is not disclosed by George et al. Applicant notes that a similar limitation was added to the claims of Application Serial No. 10/237,432 to distinguish over George et al. and that application has since been allowed.

Claim 7

Applicant has amended claim 7 with similar limitations as amended claims 1 and 6. Thus, amended claim 7 is patentable over the cited references for at least the same reasons as amended claims 1 and 6.

Summary

In summary, claims 1 to 7 were pending in the present application. Applicant has amended claims 1, 2, 6, and 7. Applicant requests the Examiner to withdraw the claim rejections and allow claims 1 to 7. Should the Examiner have any questions, please call the undersigned at (408) 382-0480x206.

Respectfully submitted,

/David C Hsia/

David C. Hsia
Attorney for Applicant(s)
Reg. No. 46,235

Patent Law Group LLP
2635 North First St., Ste. 223
San Jose, California 95134
408-382-0480x206